

and is both novel and interesting. It is the longest section in the book, occupying nearly one-third of the whole, and may be commended as being what the editor claims for it—the most authoritative and detailed account of the process which has yet appeared in the language.

A short account of the Stassfurt industry and of the extraction of potassium and magnesium salts, very slightly and imperfectly treated, concludes the volume.

A book of this kind may serve to show how dependent industry is upon science, and may possibly quicken the interest of the general reader in a question of which the national importance is now being forcibly brought home to us. But it is difficult to see what other useful purpose it fulfils. It certainly is not calculated to strengthen the position of any one of the branches of technological chemistry with which it professes to deal.

OPEN-AIR NATURAL HISTORY.

(1) *Rambles of a Canadian Naturalist*. By S. T. Wood. Pp. vii+247. (London: J. M. Dent and Sons, Ltd., 1916.) Price 6s.

(2) *The Life Story of an Otter*. By J. C. Tregarthen. New edition. Pp. xiii+188. (London: John Murray, 1915.) Price 2s. 6d.

(1) **T**HE rambles of which Mr. S. T. Wood gives an account were pursued throughout the year, and their record makes a pleasant season-book. The studies express a blend of biological inquiry and poetic reflectiveness, and they represent an end, rather than a means, of nature-study. They put into words the joyous, intelligent appreciation which well-educated, normal human beings have, or should have, when they take country walks. "What is seen and heard—things revealed to the eye and ear—awaken a delighted interest, but our thoughts and fancies, stirred by what is partly revealed, have a deeper charm. Following these suburban rambles may yield the keen pleasure of observations verified. And, perhaps, in the wayward ramblings a community of fancy may be discovered more pleasant and more fraternal than the kindred joy of disclosing Nature's guarded secrets."

The author writes of the pitcher-plant and its interrelations, the early migrants and flowers, the renaissance of spring, the honking of the wild-geese, the night-cries of the toads, the beauty of the dandelion, the midsummer birds, the life-cycle of the *Promethea* moth, the gorge below Niagara, the Great Northern Diver, the autumnal flocking, the haunt of the coot, some winter-visitors, and much more besides. We cannot say that we have found anything very remarkable in these essays, but we found each of them too short—which points to fine quality. They are altogether wholesome and beautiful, indirectly educative in the best sense.

Worthy of the highest praise are the characteristic colour illustrations—by Robert Holmes—of whip-poor-will, bloodroot, *Promethea* moth, lady's slipper, monarch butterfly, and winter's

robin. There are also beautiful chapter-headings (of nature-study inspiration) by students of the Ontario College of Art. They are in fine harmony with the spirit of the book.

(2) Mr. J. C. Tregarthen's admirable "Life Story of an Otter" appears in a new edition, which deserves a wide welcome. With patience and sympathy he has been able to build up a coherent biography of a singularly elusive creature, which few naturalists know except in glimpses. His account of the education of the cubs, of the varied business of life, of the nomadism, of the combats of dog-otters, of the partnership of the pair, of the inextinguishable playfulness, and so on, is altogether admirable.

Mr. Tregarthen writes of what he has seen, his inferences are restrained, and his style suggests the open air. We do not share his enthusiasm for the otter-hunt, for which, however, he is prepared to give a reasoned defence, but we recognise the value of his first-hand observational natural history. There are some beautiful and interesting illustrations of the otter and its haunts.

OUR BOOKSHELF.

Penzance and the Land's End District. Edited by J. B. Cornish and J. A. D. Bridger. Pp. 128. (London: The Homeland Association, Ltd., n.d.) Price 6d. net.

THE Penzance Chamber of Commerce has conferred a boon on all visitors to their beautiful district, and especially on those who are interested in something more than mere scenery. Guide-books are generally most disappointing to anyone who seeks information on the geology or natural history of a region which is new to him, but the guide-book recently added to the Homeland series is a good example of the way in which the needs of scientific visitors may be met without in the least detracting from the usefulness of the book to the ordinary reader. The chapters dealing with each special topic have been entrusted to experts who know the district thoroughly, and they are consequently of real use to other experts or students to whom Penzance and its neighbourhood may be comparatively unknown.

The book is well got up, clearly printed in good type, very well illustrated, and is written in an easy and interesting style. There is a clear map of Penzance, and a sufficient map accompanies Mr. Dewey's lucid account of the local geology. The map of the district, however, might well be improved. It is a reproduction of the one-inch Ordnance Survey map, but seems to lack clearness. This is particularly noticeable in the names of points, bays, and places along the coast, which are often so obscured by the unnecessary shading of the sea as to be barely legible even with a lens. Again, Mr. J. B. Cornish contributes a good account of the antiquities of the district, and the value of this interesting chapter to an archæologist would be greatly enhanced if the places described could be easily identified, as by

red dots, or letters, or some such device printed on the map. This is, however, a small detail, and on the whole the book is one which we hope will be imitated for other holiday resorts.

Economics: An Introduction for the General Reader. By Henry Clay. Pp. xvi+476. (London: Macmillan and Co., Ltd., 1916.) Price 3s. 6d. net.

MR. CLAY has written a meritorious, in many ways an excellent, book; but, though his style is good and his reasoning clear, he has neither the elevated clarity of Bagehot nor the racy charm of Mr. Hartley Withers. Very rightly has he laid special emphasis both on the problems which border the two provinces of politics and ethics and on such essentially vital questions as speculation and wages. Indeed, his chapters on these last-mentioned subjects, amongst the best in the book, merit the highest praise. But the pages on banking, though containing an interesting discussion of the principles of finance, would, we fear, with their continual glib references to "runs," "liquid assets," etc., prove difficult reading for, let us say, a tutorial class; nor are such sentences as: "There is an 'intensive' as well as an 'extensive' margin of cultivation . . ." very delectable nourishment for the general reader.

The book, in fact, though in many ways an excellent elementary treatise on economics, is essentially academic.

The scope of the work has already been indicated, and includes the ordinary principles, money, banking, and finance. But it is not quite clear why Mr. Clay should consider that "the object . . . of economics is explanation solely," or that "ought" must necessarily involve a moral content. Surely it is arguable that any teleological conception may involve an appendent obligation, and that economics is a normative science. May we add that the absence of an index is not the criterion of popularity?

A. L.

Methods in Practical Petrology: Hints on the Preparation and Examination of Rock Slices. By H. B. Milner and G. M. Part. Pp. vii+68. (Cambridge: W. Heffer and Sons, Ltd., 1916.) Price 2s. 6d. net.

THIS little book cannot be regarded as in any sense a complete exposition of the subject, but it contains some useful suggestions, especially on section-cutting and simple microchemical methods, including staining. It was, however, hardly necessary to give directions for the preparation of well-known dyes, such as fuchsine, malachite-green, and methylene-blue. We are even told how to prepare nitroso-dimethyl-aniline, one of the substances employed in the production of methylene-blue. Several pages are devoted to the subject of the classification of rocks, which is necessarily so briefly treated as to be somewhat misleading in places. If these digressions had been omitted, space would have been obtained for a more extended consideration of the practical methods with which the book is primarily concerned.

LETTERS TO THE EDITOR.

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Negative Liquid Pressure at High Temperatures.

IT must have been remarked in the discussions of the various forms of equation of state for vapour-liquid (cf. K. Onnes and Keesom, "Ency. der Math.," or in Leyden Communications, xi., 1912, p. 727) that this equation should determine the range of possible negative pressures in liquid. If we could assume the van der Waals form of equation to hold over the wide range that is concerned, it would readily follow that negative pressure could subsist only at absolute temperatures below $27/32$ of the critical point of the substance. For water the latter is 365°C. ; thus in that substance internal tension could (theoretically) persist up to 538° absolute, which is 265°C. Such an order of magnitude appears at first sight surprisingly high, though really there is nothing to compare it with. By an oversight I have recently (Proc. Lond. Math. Soc., 1916, p. 191) quoted the critical point of water as 365° absolute, and so obtained the much lower limit 35°C. ; and it was a reference to experiments by Prof. H. H. Dixon (Proc. R. Dublin Soc., 1914, p. 233), realising, for vegetable sap, tensions of the order of a hundred atmospheres at temperatures around 80°C. , that has given rise to this correction.

JOSEPH LARMOR.

Cambridge, June 24.

Science, Scholarships, and the State.

ALL scientific men must welcome the renewed vigour of the campaign for a recognition of science by the State, and incidentally for the introduction of scientific instruction into our public schools, a campaign in which NATURE has taken so prominent a part. I have followed with the greatest interest the pronouncements of the many eminent men on the subject of science and Government published from time to time, and in view of the greatness of the authorities who have written on the question it is with considerable diffidence that I direct attention to what seems to be an oversight in many of the views put forward as to the proper way to give science its due in England.

I refer to the continued proposals to found fresh scholarships for the encouragement of scientific research, accompanied as they so often are by statements as to the lack of trained men of science. In view of the present (or rather, as I have no actual experience of the present conditions in England, let us say the pre-war) attitude of the State, the universities, and private enterprise towards the men already trained, it seems to me futile to make plans for training fresh men until very definite steps have been taken to see that there are to be recognition and scope granted to them when trained. Anyone who has a knowledge of the typical careers of the most successful (from a scientific point of view) students and younger research workers will readily understand the state of things I have in mind. If a concrete example is required, the case of the 1851 Exhibition scholars may be cited: I choose this case as those scholarships are in the nature of State institutions. They would seem to be exactly of the type intended by the advocates of the establishment of new scholarships; they are, according to the conditions of award (so far as I can recollect